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Calculating relative atomic mass - Higher

Atoms consist of a nucleus containing protons and neutrons, surrounded by electrons in shells. The numbers of particles in an atom can be calculated from its atomic number and mass number.

Part of **Combined Science** **Key concepts in chemistry**

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The relative atomic mass, A_r, of an element is calculated from:

- the mass numbers of its isotopes
- the abundance of these isotopes

Chlorine

Chlorine naturally exists as two isotopes, ${}^{35}_{17}\mathrm{Cl}$ (chlorine-35) and ${}^{37}_{17}\mathrm{Cl}$ (chlorine-37). The abundance of chlorine-35 is 75% and the abundance of chlorine-37 is 25%. In other words, in every 100 chlorine atoms, 75 atoms have a mass number of 35, and 25 atoms have a mass number of 37.

To calculate the relative atomic mass, A_r, of chlorine:

$$Ar = \frac{total\ mass\ of\ atoms}{total\ number\ of\ atoms} = \frac{(35 \times 75) + (37 \times 25)}{(75 + 25)}$$

$$Ar = \frac{2625 + 925}{100} = \frac{3550}{100}$$

$Ar = 35.5$ (to 1 decimal place)

Notice that the answer is closer to 35 than it is to 37. This is because the chlorine-35 isotope is much more abundant than the chlorine-37 isotope.

Question

The table shows the mass numbers and abundances of naturally-occurring copper isotopes.

Mass number	Abundance
63	69%
65	31%

Calculate the relative atomic mass of copper. Give your answer to 1 decimal place.

Show answer

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